

IN THE SPECIFICATION

Please replace the paragraph [0010] with the following rewritten paragraph:

[0010] According to another aspect, the present invention provides a method for making a phosphor. The method comprises: (a) mixing oxygen-containing compounds of: (1) at least a first metal selected from the group consisting of yttrium and the lanthanide series other than europium; (2) at least a second metal selected from the group consisting of aluminum, gallium, indium, and scandium; (3) boron; and (4) europium to form a mixture; and (b) heating the mixture in an oxygen-containing atmosphere at a temperature in a range from about [[900C]]900°C to about [[1400C]]1400°C for a time sufficient to convert the mixture to the phosphor.

Please replace the paragraph [0011] with the following rewritten paragraph:

[0011] According to another aspect, a method for making a phosphor comprises: (a) providing a first solution that comprises: (1) at least a compound of at least a first metal selected from the group consisting of yttrium and the lanthanide series other than europium; (2) at least a compound of a second metal selected from the group consisting of aluminum, gallium, indium, and scandium; (3) a compound of boron; and (4) a compound of europium; (b) combining the first solution and a second solution, the second solution comprising at least a compound selected from the group consisting of ammonium hydroxide; hydroxides of at least one element selected from the group consisting of said at least a first metal, said at least a second metal, boron, and europium; organic esters; and organic amines to produce a precipitate; (b) heating the precipitate in an oxygen-containing atmosphere at a temperature in a range from about [[900C]]900°C to about [[1400C]]1400°C for a time sufficient to convert the mixture to the phosphor.

Please replace the paragraph [0018] with the following rewritten paragraph:

[0018] In general, the present invention provides phosphors that comprise metals of Group IIIA and IIIB of the Periodic Table. The phosphors are excitable by radiation in the UV range (i.e., having wavelengths in the range from about 200 nm to about 400 nm) to emit in the red-light wavelengths (i.e., from about 600 nm to about 770 nm), preferably from about 600 nm to about 700 nm. Further, chemical formulae are used to represent materials in such a way that, whenever more than two elements are included within a parenthesis, it implies that at least one of the elements need to be present in the material.

Please replace the paragraph [0026] with the following rewritten paragraph:

[0026] A phosphor of the present invention can be produced by a dry method or a wet method. The dry method comprises: (a) mixing oxygen-containing compounds of: (1) at least a first metal selected from the group consisting of yttrium and the lanthanide series other than europium; (2) at least a second metal selected from the group consisting of aluminum, gallium, indium, and scandium; (3) boron; and (4) europium to form a mixture; and (b) heating the mixture in an oxygen-containing atmosphere at a temperature in a range from about [[900C]]900°C to about [[1400C]]1400°C for a time sufficient to convert the mixture to the phosphor. A heating time in a range from about 1 minute to about 10 hours is adequate. It should be noted that the heating time can depend on the amount of material being treated to produce the phosphor, or on the extent of contact between the solid and the oxygen-containing atmosphere, or on the degree of mixing while the mixture is heated. Preferably, the temperature is in the range from about [[900C]]900°C to about [[1200C]]1200°C.

Please replace the paragraph [0027] with the following rewritten paragraph:

[0027] The mixture can be rapidly brought to and held at the final temperature. Alternatively, the mixture may be heated up to the final temperature at a lower rate, such as from about ~~10C/minute~~ 10°C/minute to about ~~200C/minute~~ 200°C/minute, preferably from about ~~10C/minute~~ 10°C/minute to about ~~100C/minute~~ 100°C/minute.

Please replace the paragraph [0032] with the following rewritten paragraph:

[0032] The oxygen-containing compounds may be mixed together by any mechanical method including, but not limited to, stirring or blending in a high-speed blender or a ribbon blender. The oxygen-containing compounds may be combined and pulverized together in a bowl mill, a hammer mill, or a jet mill. The mixing may be carried out by wet milling especially when the mixture of the oxygen-containing compounds is to be made into a solution for subsequent precipitation. If the mixture is wet, it may be dried first before being heated to a temperature in the range from about ~~[[900 C]]~~ 900°C to about ~~[[1400 C]]~~ 1400°C. The drying may be carried out at ambient atmosphere or under a vacuum. The heating may be conducted in a batchwise or continuous process, preferably with a stirring or mixing action to promote good gas-solid contact. The firing time depends on the quantity of the mixture to be fired, the rate of gas conducted through the firing equipment, and the quality of the gas-solid contact in the firing equipment. Typically, a heating time from about 1 minute to about 10 hours is adequate.

Please replace the paragraph [0038] with the following rewritten paragraph:

[0038] The temperature was ramped up at a rate of about ~~100-C/minute~~ 100°C/minute to between ~~[[1000]]~~ 1000°C and ~~[[1200 C]]~~ 1200°C. The mixture was heated for a total time of about 4 hours in an alumina crucible in air. After heating, the resulting material was washed in hot water to remove any unreacted boric acid, and dried. The phosphor

has a composition of $\text{Gd}_{0.9}\text{Eu}_{0.1}\text{Al}_3\text{B}_4\text{O}_{12}$. The dried material was milled to median particle size of about 6 μm for further testing.

Please replace the paragraph Table 1 with the following rewritten Table1:

Table 1

Composition	Preparation Method	Firing Temperature ($^{\circ}\text{C}$)	Quantum Efficiency (% of standard phosphor)	Absorbance (% of standard phosphor)	Notes
($\text{Y}_{0.95}\text{Eu}_{0.05}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	dry	1200	73	63	2% excess H_3BO_3
($\text{Y}_{0.9}\text{Eu}_{0.1}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	dry	1200	74	78	2% excess H_3BO_3
($\text{Y}_{0.875}\text{Eu}_{0.125}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	dry	1200	69	81	2% excess H_3BO_3
($\text{Y}_{0.8}\text{Eu}_{0.2}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	dry	1200	71	81	2% excess H_3BO_3
($\text{Y}_{0.95}\text{Eu}_{0.05}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	wet	1150	68	58	2% excess H_3BO_3
($\text{Y}_{0.9}\text{Eu}_{0.1}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	wet	1150	70	67	2% excess H_3BO_3
($\text{Y}_{0.8}\text{Eu}_{0.2}$) $\text{Al}_3\text{B}_4\text{O}_{12}$	wet	1150	69	67	2% excess H_3BO_3

Please replace the paragraph [0040] with the following rewritten paragraph:

[0040] The wet method of preparation of a phosphor of the present invention comprises: (a) providing a first solution that comprises: (1) at least a compound of at least a first element selected from the group consisting of yttrium and elements of lanthanide series other than europium; (2) at least a compound of at least a second element selected from the group consisting of aluminum, gallium, indium and scandium; (3) at least a compound of boron; and (4) at least a compound of europium; (b) adding a second

solution to the first solution to produce a precipitate comprising compounds of the first element, the second element, boron, and europium; the second solution comprising a base selected from the group consisting of ammonium hydroxide; hydroxides of at least one element selected from the group consisting of yttrium, elements of lanthanide series; organic esters of carboxylic acids; organic amines; and combinations thereof; and (c) heating the precipitate in an oxygen-containing atmosphere at a temperature in a range from about [[900C]]900°C to about [[1400 C]]1400°C for a time sufficient to convert the precipitate to the phosphor. In one embodiment, the second element is selected from the group consisting of Y, Ce, Pr, Sm, La, Gd, Tb, Lu, and combinations thereof. In another embodiment, the second element is selected from the group consisting of Gd, Y, Sm, La, Lu, and combinations thereof. In still another embodiment, the second element is a combination of Y and Gd.

Please replace the paragraph [0042] with the following rewritten paragraph:

[0042] In another embodiment, oxides or other oxygen-containing compounds of at least one of the first elements, at least one of the second elements, europium, and boron are dissolved in an acidic solution, such as hydrochloric acid, nitric acid, sulfuric acid, citric acid, or acetic acid. The strength of the acid solution is chosen to rapidly dissolve the oxides or the oxygen-containing compounds, and the choice is within the skill of a person skilled in the art. Ammonium hydroxide is then added in increments to the acidic solution containing the first element, the second element, europium, and boron while stirring to precipitate a mixture of hydroxides of the first element, the second element, europium, and boron. An organic base; such as methanolamine, ethanolamine, propanolamine, dimethanolamine, diethanolamine, dipropanolamine, trimethanolamine, triethanolamine, or tripropanolamine; may be used in place of ammonium hydroxide. Alternatively, an ester of an organic acid may be used to carry out the precipitation; such as methyl, ethyl, or propyl esters of acetic acid, propionic acid, butyric acid, oxalic acid, malonic acid, succinic acid, or glutaric acid; dimethyl, diethyl, dipropyl esters of oxalic

acid, malonic acid, succinic acid, or glutaric acid. The precipitate is filtered, washed with deionized water, and optionally dried. The dried precipitate is ball milled or otherwise thoroughly blended and then heated in an oxygen-containing atmosphere at a temperature in the range from about [[900C]]900°C to about [[1400C]]1400°C, preferably from about [[900 C]]900°C to about [[1200 C]]1200°C. Alternatively, the wet precipitate can be heated first, and then ball milled or otherwise thoroughly blended afterward.